

REMARKS

Claims in the case are 1-6 and 8-11, upon entry of this amendment. Claims 1, 2, 4, 5, 9 and 10 have been amended, and Claim 11 has been added.

Basis for added Claim 11 is found in Claim 6, and at page 9, lines 10-13 of the specification.

Basis for the amendments to Claims 1 and 4 with regard to the catalyst is found at page 9, lines 1-8 of the specification. Basis for the amendment of Claim 4 with regard to composition components (i) through (iv) is found in Claim 1 (from which Claim 4 previously depended), and at page 1, line 27 through page 2, line 11 of the specification. Basis for the term "melt transesterification" in Claims 1 and 4 is found at page 9, line 26 of the specification. The claims have also been amended as to form, e.g., by replacing "characterized in that " with --wherein--.

Claims 1-5 and 8-10 stand rejected under 35 U.S.C. §102(b) as being anticipated by United States Patent No. 5,373,082 (Kauth et al). This rejection is respectfully traversed in light of the amendments herein and the following remarks.

Kauth et al disclose a process of preparing a polycarbonate which includes:

- (i) dissolving polycarbonate waste resin in monophenols, and degrading the waste resin, in the presence of quaternary phosphonium compounds, to form oligocarbonates, diaryl carbonates and diphenols;
- (ii) preparing, by partial recondensation, a higher viscosity oligocarbonate from the oligocarbonates, diaryl carbonates and diphenols of the degradation step; and
- (iii) polycondensing, in the presence of a further catalyst, the higher viscosity oligocarbonate to form the polycarbonate resin.

See the abstract; and column 1, line 25 through column 2, line 3 Kauth et al.

The polycarbonate of Applicants' present claims is prepared by the melt transesterification of a composition of diphenols, chain terminators and optional branching agents, in the presence of a phosphonium catalyst (Claim 1). The polycarbonate of Applicants' claims is prepared by the melt transesterification of monomers. Kauth et al does not disclose preparing a polycarbonate from monomers (e.g., from a composition of diphenols, chain terminators and optional branching agents). Rather, Kauth et al disclose a multistep process that involves the

degradation of polycarbonate resin waste to form a first oligocarbonate, partially recondensing the first oligocarbonate to form a second higher molecular weight oligocarbonate, and then polycondensing the second oligocarbonate to form a polycarbonate resin.

Kauth et al's process involves the presence of either a polymer or an oligomer at each stage, and does not involve monomers alone at any stage thereof. As is known to the skilled artisan, polycarbonates prepared from oligocarbonates have properties that are different from polycarbonates prepared from monomers. Such differing properties include, for example, chain structure, the degree of branching and molecular weight distribution. The components of the polycarbonates prepared by the process of Kauth et al have been exposed to several heat cycles (e.g., preparation of the feed polycarbonate waste resin, degradation thereof to form an oligocarbonate, partial recondensation of the oligocarbonate, and polycondensation of the partially recondensated oligocarbonate). Such a plurality of heat cycles increases the level of oxidative modification / degradation to the backbone of the polycarbonates prepared by the process of Kauth et al. The polycarbonates of Applicants' present claims are prepared from monomers, which are in effect exposed to a single heat cycle, thus minimizing the degree of oxidative modification / degradation of the backbone. As such, the polycarbonates of Applicants' claims are different from those prepared by the process of Kauth et al.

Kauth et al does not disclose the process of Applicants' present Claims. As discussed previously herein, Kauth et al disclose a multistep process for preparing a polycarbonate which involves the degradation of polycarbonate resin waste to form a first oligocarbonate, partially recondensing the first oligocarbonate to form a second higher molecular weight oligocarbonate, and then polycondensing the second oligocarbonate to form a polycarbonate resin. In contrast, the process of Applicants' claims involves the melt transesterification of a composition of monomers.

On page 2 of the Office Action of 13 August 2003, it is argued that Kauth et al's disclosure of certain preferred diphenols anticipates Applicants' Claim 1 with regard to the definitions of R etc. Applicants respectfully disagree. First, Kauth et al do not disclose the use of diphenols in their process. Rather Kauth et al disclose the polycarbonate waste resin as itself being made from (i.e., as including residues of) diphenols in its backbone (column 1, lines 25-42; and column 2, lines 35-51). Secondly, the definitions of "R etc" (i.e., R, R' and R") of Applicants' claims are directed to chain terminators (ii) which are monophenols, not diphenols.

In light of the amendments herein and the preceding remarks, Applicants' claims are deemed to be unanticipated by and patentable over Kauth et al. Reconsideration and withdrawal of this rejection is respectfully requested.

Claim 6 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Kauth et al in view of United States Patent No. 5,922,826 (**Kuze et al**). This rejection is respectfully traversed with regard to the amendments herein and the following remarks.

Kauth et al has been discussed previously herein, and discloses a multistep process for preparing a polycarbonate which involves the degradation of polycarbonate resin waste to form a first oligocarbonate, partially recondensing the first oligocarbonate to form a second higher molecular weight oligocarbonate, and then polycondensing the second oligocarbonate to form a polycarbonate resin. Kauth et al does not disclose, teach or suggest the process of Applicants' claims, which involves preparing a polycarbonate from monomers (e.g., from a composition of diphenols, chain terminators and optional branching agents). Further Kauth et al does not disclose or suggest the use of tetraphenylphosphonium phenolate as a catalyst in the transesterification preparation of a polycarbonate from a composition of monomers.

Kuze et al disclose a process for preparing a polycarbonate by transesterification in the presence of a polymerization catalyst (abstract). Kuze et al disclose a first aspect of polycarbonate preparation that involves performing a transesterification reaction in the presence of a catalyst combination of (a) a nitrogen-containing organic basic compound, and (b) a quaternary phosphonium salt. See column 2, lines 60-65 of Kuze et al. The first aspect of Kuze et al's process does

not disclose or suggest the process of Applicants' Claim 6 in which the catalyst is tetraphenylphosphonium phenolate alone.

In a second aspect, Kuze et al disclose the preparation of a polycarbonate in the presence of a quaternary phosphonium salt represented by their formula (III). See column 2, line 66 through column 3, line 19 of Kuze et al. The quaternary phosphonium salt represented by Kauth et al's formula (III) does not represent a disclosure or suggestion as to the tetraphenylphosphonium phenolate of Applicants' Claim 6.

In a third aspect, Kuze et al disclose the preparation of a polycarbonate by transesterification in the presence of a quaternary phosphonium salt containing a branched alkyl group (column 3, lines 20-24; and column 13, formula IV). The quaternary phosphonium salt containing a branched alkyl group of Kuze et al's third aspect does not disclose or suggest the tetraphenylphosphonium phenolate of Applicants' Claim 6.

In a fourth aspect, Kuze et al disclose a process for preparing a polycarbonate, which includes the steps of: (i) preparing a polycarbonate prepolymer by preliminary polymerization; and (ii) forming the polycarbonate by solid state polymerization of the polycarbonate prepolymer in the presence of a quaternary phosphonium salt. The solid state polymerization of Kuze et al's fourth embodiment is distinct from and does not reach or touch upon the melt transesterification of Applicants' present claims. The melt transesterification process of Applicants' present claims involves melting the reactants to form a molten / liquid reaction medium, which is not a solid state medium.

As discussed previously herein, Kauth et al disclose a multistep process of preparing a polycarbonate which involves the degradation of polycarbonate resin waste to form a first oligocarbonate, partially recondensing the first oligocarbonate to form a second higher molecular weight oligocarbonate, and then polycondensing the second oligocarbonate to form a polycarbonate resin. Kuze et al provide no disclosure or suggestion as to preparing a polycarbonate by means of a multistep process involving the degradation of a polycarbonate waste resin. Kuze et al provide no disclosure or suggestion as to preparing a polycarbonate from an oligocarbonate formed from degradation of a polycarbonate waste resin.

Kauth et al provide no disclosure or suggestion with regard to performing their multistep process in the presence of: a catalyst combination of (a) a nitrogen-containing organic basic compound, and (b) a quaternary phosphonium salt; or a quaternary phosphonium salt represented by Kuze et al's formula (III); or a quaternary phosphonium salt containing a branched alkyl group according to Kuze et al's formula IV. In addition, Kauth et al provide no disclosure, teaching or suggestion as to preparing a polycarbonate by a process that involves a solid state polymerization.

In light of the preceding remarks neither Kauth et al nor Kuze et al provide the requisite disclosure or suggestion that would motivate a skilled artisan to combine or otherwise modify their respective disclosures to arrive at Applicants' presently claimed invention. As the Court of Appeals for the Federal Circuit has stated, there are three possible sources for motivation to combine references in a manner that would render claims obvious. These are: (1) the nature of the problem to be solved; (2) the teaching of the prior art; and (3) the knowledge of persons of ordinary skill in the art, *In re Rouffet*, 47 U.S.P.Q.2d 1453, 1458 (Fed. Cir. 1998). The nature of the problem to be solved and the knowledge of persons of ordinary skill in the art are not present here and have not been relied upon in the rejection. As for the teaching of the prior art, the above discussion has established that neither of the patents relied upon in the rejection provide the requisite teaching, and certainly do not provide the motivation or suggestion to combine that is required by Court decisions.

The rejection appears to make use of impermissible hindsight reconstruction in picking and choosing from or otherwise modifying the cited references. Modifying "prior art references without evidence of such a suggestion, teaching or motivation simply takes the inventor's disclosure as a blueprint for piecing together the prior art to defeat patentability -- the essence of hindsight." *In re Dembicza*k, 175 F.3d 994, 999 (Fed. Cir. 1999).

In light of the amendments herein and the preceding remarks, Applicants' claims are deemed to be unobvious and patentable over Kauth et al in view of Kuze et al. Reconsideration and withdrawal of this rejection is respectfully requested.

In light of the amendments herein and the preceding remarks, Applicants' presently pending claims are deemed to define an invention that is unanticipated, unobvious and hence, patentable. Reconsideration of the rejections and allowance of all of the presently pending claims is respectfully requested.

Respectfully submitted,

By 
James R. Franks
Agent for Applicants
Reg. No. 42,552

Bayer Polymers LLC
100 Bayer Road
Pittsburgh, Pennsylvania 15205-9741
(412) 777-3808
FACSIMILE PHONE NUMBER:
(412) 777-3902

/jme/JRF/JF0252